

only two tentacles, which, instead of being placed on the head, as in *Philomycus* and all the other *Arionidae* and *Helicidae*, are placed in the front part of the mantle. All these characters induce me to regard it as the type of a new family of *Pulmonata*, which may be called *Janellidae*.

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XL.—Notes on the Habits of Bivalve Shell-fish.

By S. P. WOODWARD.

DURING the past summer I spent some time with Mr. Mackie at Folkestone, and being obliged to remain within-doors the greater part of each day, I collected a number of living Bivalves, and kept them in pans of salt water, to watch them at my leisure. The first species met with were *Pholas dactylus* and *candida*, whose colonies are frequent in the beach near low-water mark, wherever a clear space occurs amongst the blocks of Kentish-rag with which the shore is encumbered. The burrows of the Pholades are in black sandy mud, from which they are easily dislodged. At some spots the inhabitants have perished, but the living colonies are readily discovered by treading heavily, or striking the beach with a stick, whereupon the alarmed inmates spirt water from their burrows. The holes of the full-grown *Pholas dactylus* are distinguishable by their larger size, and the strong jets they send up; the original small orifices have been removed by the wasting of the beach, and the present openings, an inch in diameter, were once the middle of each burrow; they are rendered somewhat smaller by a layer of light-coloured mud, which fills up the space between the shell-fish and the wall of its abode. When the shell is partly exposed the *Pholas* still holds strongly with its great foot, which cannot be withdrawn into the shell, and resembles a piece of translucent ice.

Placed in a pan of sea water, the smaller Pholades (*P. candida*) immediately protrude their siphons, and explore the surrounding bottom with them in a remarkably worm-like manner. The young of *P. dactylus* only pushes itself about with its siphons. The branchial currents commence instantly, and never cease unless the creatures are disturbed. The force and volume of these currents are quite marvellous to those who witness them for the first time. The inhalant orifice is trumpet-shaped, and guarded with *cirri*; the exhalant is a little contracted, and in *P. dactylus* projects beyond the other. The foot completely fills the pedal orifice, allowing neither ingress nor egress to currents of water. The current which sets into the branchial siphon carries with it whatever floating particles the water contains, whilst the stream which issues from the exhalant orifice is perfectly clear. However turbid the water may be, it is soon filtered, and the same thing

happens if the water is artificially coloured with indigo; the time required depending partly on the quality of the pigment, which is sometimes so fine as to pass through the living filter. When one *Pholas* was disturbed by another, or incommoded by particles too large for its siphon, it closed its valves and partly retracted the siphons, making a small jet of water. If taken from the pan suddenly, the siphonal orifices closed spasmodically, so that no water could escape, and the siphons could not be withdrawn; after a moment the orifices relaxed, and the water was spirited out. The tentacular *cirri* are extremely sensitive, and contract directly they are touched, but the mantle may be divided with fine-pointed scissors, so as to show the gills, without causing any alarm to the animal, after the sphincter surrounding the foot has once been divided. It was my wish to preserve examples of each species with the siphons protruded, and to this end I allowed some to remain in stale water, thinking they would lose the power of retraction, or die extended; day after day the siphons became longer, until they were twice their proper length, the currents ceased, and at last the valves fell off by the decomposition of the mantle; but when I attempted to remove the animal, the siphons slowly contracted until completely withdrawn.

Another small *vivarium* contained a few shells from five fathoms water; including the young of the edible mussel an inch in length, *Syndosmya alba*, *Nucula nucleus*. Some others were tenanted with the common cockle, *Donax anatinus* and *Tellina solidula* and *tenuis*, obtained from the sandy shore at Denge Ness, where the sea goes out nearly half a mile, leaving a wide waste of ripple-marked sands without any trace of life, save the castings of the Annelides and an occasional dimple made by a cockle or a *Donax*. But of life there was plenty, as we might be sure from the flocks of gulls which retreated before us; and on exploring with our hands we found the whole beach planted with *Tellens*, in a vertical position, as thickly together as holes made simultaneously with the fingers. Lower down there must have been many other shell-fish; for the high-water line was strewn with *Maetras* and *Cardium echinatum*, *Solen marginatus* and *ensis*, spawn of *Natica* and whelk, &c. The common cockle is an excellent subject for observation on account of its activity, the beauty of its fringed siphons, and the whirlpools it creates in the water. *Donax* has short siphons, with foliaceous *cirri*; *Tellina* and *Syndosmya* have very long siphons, sometimes four or five times as long as the shell, very slender and transparent, with simple orifices. Those *Tellens* and *Donaxes* which were allowed sea-sand soon buried themselves, protruding only their siphons. In a short time the sand in which they were buried became so firm that it required

some force to move it with the fingers. On changing the water, small holes would appear in the sand, from which afterwards the siphons of the Tellens were protruded. These holes were in pairs, and about the tenth of an inch in diameter; one was a little funnel, into which the grains of sand kept sliding, the other a miniature crater of sand. After the siphons were extended, they frequently bent them down and explored the surface, being evidently dissatisfied with their circumstances. Slender as the branchial siphon is in *Tellina* and *Syndosmya*, it frequently attracts particles too large to pass freely, and which after oscillating for an instant halfway down, are suddenly expelled with a jerk. Besides watching the Bivalves, we sketched them whilst living, and dissected them—or at least cut them up in every possible way—when dead, and examined them with the microscope. Everything we saw confirmed the accuracy of the account given by Messrs. Alder and Hancock in the ‘Ann. Nat. Hist.’

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XLI.—*Centuries of North American Fungi.* By the Rev. M. J. BERKELEY, M.A., F.L.S., and the Rev. M. A. CURTIS, D.D.

IT is proposed in this and a series of similar memoirs to characterise a number of new North American Fungi, which have rewarded the researches of Curtis, Ravenel, Bennett, Michener, Olney, Peters, Sartwell, Lindheimer, Wright, and other botanists. It was intended at first to publish the whole in an especial work dedicated to North American Mycology, but it was found impossible to prepare so voluminous a book as a complete account of the Fungi of the United States within any fixed time, and we have therefore thought it right to publish the multitudes of new species which exist in our Herbaria by way of Prodrusus, trusting that the larger work may not be put off to the Greek Calends. We ought to observe that a considerable portion of Mr. Ravenel's specimens were accompanied by copious notes, of which we have constantly availed ourselves. Indeed his name might almost uniformly have been associated with our own, were it not for the inconvenience of giving three authorities for each new species.

1. *Agaricus* (*Amanita*) *polypyramis*, n. s. Pileo expanso nitido areolato verrucis centralibus crassis pyramidatis; stipite radicante, basi incrassato squamuloso, lamellis attingentibus. Curt. no. 2854. In thin woods, Nov., South Carolina.

Pileus 6 inches across, pure white, shining, areolate, beset with thick, rather small, pointed pyramidal warts, especially in the centre. Stem 6–8 inches high, 1–2 inches thick, solid, incrassate.

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